Citation:

Nooyens AC, Visscher TL, Schuit AJ, van Rossum CT, Verschuren WM, van Mechelen W, Seidell JC. Effects of retirement on lifestyle in relation to changes in weight and waist circumference in Dutch men: a prospective study. *Public Health Nutr.* 2005 Dec;8(8):1266-74.

PubMed ID: 16372922

Study Design:

Prospective Cohort Study

Class:

B - Click here for explanation of classification scheme.

Research Design and Implementation Rating:

POSITIVE: See Research Design and Implementation Criteria Checklist below.

Research Purpose:

To study the impact of retirement on diet, physical activity, body mass index (BMI) and waist circumference, over a 5-year follow-up period, in a population-based cohort.

Inclusion Criteria:

- Men aged 50 - 65 years
- Inhabitants of Doetinchem, The Netherlands
- Men with complete data on body weight and waist circumference at baseline and follow-up

Exclusion Criteria:

Men diagnosed with:

- cancer
- cardiovascular disease
- diabetes
- waist circumference below 79 cm

Description of Study Protocol:

Recruitment

- Participants of the Doetinchem Cohort Study
- Inhabitants aged 20-59 years of Doetinchem, The Netherlands, who visited the municipal health center.

Design

A prospective cohort study with 5 years of follow-up. At baseline and at follow-up, questionnaires were completed and body weight and waist circumference were measured.

Blinding used (if applicable): not applicable

Intervention (if applicable): not applicable

Statistical Analysis

- Demographic and anthropometric factors, and mean changes in weight, waist circumference, diet and physical activity between baseline and follow-up were compared between the groups of men with sedentary jobs and active jobs who remained working and those who retired during follow-up, based on analyses of covariance
- Associations between changes in behavior and changes in weight and waist circumference were studied by use of linear regression analysis
- Associations between retirement and changes in weight and waist circumference were studied by analyses of covariance

Data Collection Summary:

Timing of Measurements

- Baseline: 1994 - 1997
- Follow-up: 1999 - 2002

Dependent Variables

- Body weight, with subjects wearing light indoor clothing with pockets emptied and measured to the nearest 0.5kg. To adjust for light clothing, 1 kg was subtracted from the nearest weight.
- Waist circumference, measured to the nearest 0.5 cm, at the middle of the lowest rib and the iliac crest, with subjects standing and after breathing out.

Independent Variables

- Diet: potatoes, pasta, rice, meat, vegetables, snacks, drinks
- Physical Activity (hrs/wk): work, household, sports, bicycling, walking, gardening, doing odd jobs, climbing stairs

Control Variables

- Age

- Retirement vs Working
- Type of job (sedentary vs active)
- Interaction between retirement and type of occupational activity
- Smoker vs non-smoker

Description of Actual Data Sample:

Initial N:

- 12,404 visited the municipal health centre between 1987 and 1991
- 7,768 were reinvited between 1993 and 1997
- 6,582 were again invited between 1998 and 2002
- 632 men had complete data available

Attrition (final N): 288 men

Age: 50 - 65 years

Ethnicity: not mentioned

Other relevant demographics:

Education:

- low (intermediate secondary or less)
- medium (intermediate vocational or higher secondary education)
- high (higher vocational education or university)

Smoking status:

- persistent non-smoker(smoking less than one cigarette per month)
- persistent smoker
- quitter
- starter

Anthropometrics

The groups were different:

- men who were moderately overweight, working men were more moderately overweight
- men who were normal weight, retired men were more normal weight than working men

Location:

Doetinchem, a town in the rural area of The Netherlands, who visited the municipal health centre.

Summary of Results:

Key Findings

- Working men were younger than retired men
- 10% of men were obese
- Significantly more working active men were moderately overweight compared to working sedentary men, 69.2% vs 54.9%.
- More working sedentary men were normal weight than working active men, 33% vs 21%
- Working active men had less education than the working sedentary men, 54.9% vs 24.9%
- Retired sedentary men had more education than the retired active men, 45.6% vs 16.7%
- More working sedentary men were persistent smokers than retired sedentary men, 20% vs 7.3%
- 33.7 % had abdominal obesity at baseline

Retired Men with Active Jobs

- Retired men decreased the time spent on work.
- Body weight increased more among retired men who had active jobs.
- Waist circumference increased more among retired men who had active jobs.
- Retired men who had active jobs increased the time spent on odd jobs.
- Retired men decreased the amount of potatoes they consumed.
- Retired men with active jobs decreased the amount of energy they consumed.

Retired Men with Sedentary Jobs

- Time spent on work decreased significantly among retired men compared to working men.
- Retired men with sedentary jobs increased the amount of rice consumed more than retired men who had active jobs.
- Retired men decreased the amount of potatoes they consumed, both those with sedentary and active jobs.
- Retired men with sedentary jobs increased the amount of vegetables they consumed.
- Retired men with sedentary jobs increased the amount of alcoholic beverages they consumed.
- Retired men with sedentary jobs decreased the amount of protein calories they consumed.

Weight gain:

- Weight gain was statistically significantly associated with a decrease in fruit consumption
- Weight gain was statistically significant with an increase in frequency of eating breakfast
- Weight gain was statistically significant with an increase in the consumption of sugar-sweetened soft drinks.
- Weight gain was statistically associated with a decrease in fibre density.
- Weight gain was statistically associated with a decrease in time spent bicycling.

Increase in waist circumference was associated with:

- An increase in frequency of pasta consumption
- A decrease in fruit consumption

- An increase in frequency of breakfast
- An increase in consumption of sugar-sweetened soft drinks
- A decrease in fibre density
- A decrease in time spent walking
- A decrease in doing odd jobs

Table 1 Demographic and anthropometric characteristics of the study population, at baseline and during follow-up, stratified for (change) in job status

Control Variables	Working Sedentary (n=90)	Retired Sedentary (n=66)	Working Active (n=86)	Retired Active (n=46)	Significantly Different
Age(years), mean SD	53.3 (2.6)*	57.5 (2.7)*	53.1 (2.2)*	57.4 (2.3)*	P<0.10
Weight(kg)	84.3	82.1	83.7	82.8	
BMI	26.4	26	26.6	26.5	
Normal wt.	33.0*	42.2	21.6*	28.1	P<0.10
Moderate wt.(%)	54.9*	48.9	69.2*	60.5	P<0.10
Obese (%)	12.1	8.9	9.3	11.4	
WC≥102cm(%)	34.3	28	37.3	33.9	
Low Education(%)	24.9*	41.2*	54.9*	54.8	P<0.10
Medium Education (%)	31.1*	13.2*	26.9	28.6*	P<0.10
High Education (%)	44	45.6*	18.3	16.7*	P<0.10
Persistent Smoker(%)	20*	7.3*	23.3	11.3	P<0.10

+Except for age and duration of follow-up period, all variables are adjusted for age.

* statistically different

Table 2 Changes in anthropometric characteristics, physical activity and diet over the 5-year follow-up period in working and retired men with sedentary and active jobs

	Sedentary job working (n=90)		retired (n=60)		**Active job**	working (n=86)		retired (n=46)	
	mean change	95% CI	mean change	95% CI		mean change	95% CI	mean change	95% CI
Body wt (kg/yr)			0.08	-0.13, 0.30				0.42	0.17,0.67
WC (cm year)			0.23	-0.04, 0.50				0.77	0.46,1.08
Physical Activity									
Work	-5.87	- 8.98, -2.76	-32.66	-36.51,-28.82		-4.24	-7.45,-1.02	-31.10	-35.54,-26.65
Household	0.67	-0.20, 1.54	2.16	1.09,3.24					
Doing odd jobs						-0.90	-1.94,0.13	3.01	1.58,4.43
Diet									
Rice	-0.39	-0.67, -0.11	0.12	-0.22,0.47		-0.51	-0.81,-0.22	0.04	-0.39,0.48
Potatoes	-0.08	-0.76, 0.60	-1.13	-1.98,-0.29		-0.03	-0.74,0.68	-1.41	-2.39,-0.43
Vegetables	-0.73	-1.41, -0.05	0.58	-0.26,1.14		-0.13	-0.83,0.57	0.01	-0.95,0.98
Alcoholic beverages	-0.11	-0.36, 0.14	.27	-0.04,0.57					
Energy						-0.35	-0.78,0.09	-1.13	-1.73,-0.52
Protein	0.19	-0.21, 0.59	-0.60	-1.09,-0.10					

Table 3 Changes in behavior over follow-up in relation to change in body weight

Univariate models

	β	P
Physical activity		
Bicycling(hrs/wk)	-0.03	<0.01
Diet		
Fruit(times/wk)	-0.02	<0.01
Breakfast	0.07	0.03
Sugared soft drinks(glasses per day)	0.20	<0.01
Fibre density(gMJ^{-1})	-0.31	<0.01

Table 4 Changes in behavior over follow-up in relation to change in waist circumference

	β	P
Physical activity		
walking	-0.01	0.02
odd jobs	-0.03	0.04
Diet(times/wk)		
pasta	0.29	0.02
fruit	-0.03	<0.01
Breakfast	0.13	<0.01
Sugared soft drinks(glasses/day)	0.16	0.04
Fibre density(gMJ^{-1})	-0.32	<0.01

Other Findings

- The total multivariate model explained 22% of variance in changes in body weight in the study population.
- The total multivariate model explained 27% of variance in changes in waist circumference among study participants.
- When the associations between retirement and changes in weight and waist circumference were adjusted for changes in behaviors that were associated with changes in weight or waist circumference, the average gains in body weight and waist circumference for the groups of men who remained working in sedentary or active jobs became equal.
- The differences in weight gain and in increase in waist circumference between the men who retired from sedentary versus active jobs were maintained.

Author Conclusion:

Retirement was associated with an increase in weight and an increase in waist circumference among men who had active jobs.

The changes in dietary behavior and physical activity related to changes in body weight and waist circumference include: decrease in fruit consumption, decrease in fibre density, increase in eating breakfast, increase in the consumption of sugar-sweetened soft drinks, and decrease in leisure-time activities, such as household activities, bicycling, walking and doing odd jobs.

Some components such as frequency of pasta consumption, drinking alcoholic beverages, and walking were clearly related to change in waist circumference and not to change to body weight.

Retirement may bring opportunities for healthy changes in diet and physical activities.

Reviewer Comments:

Relatively small sample size and only 5 years of follow-up, however, the author believes that the study population is applicable to all men who are about to retire in other countries.

The discussion included many of the methodological issues: age differences between the retired and the working and its effect on weight gain overlap between groups, therefore, the effects of retirement could be studied independent of age, the use of questionnaires may misreport information, the educational differences were not adjusted for in the analysis, the author believed that any association is mediated by lifestyle. The exact retirement date was not known. The author assumed that changes in body weight and waist circumference do not differ between the group of men remaining at work and the last years of employment of the retiring men. This assumption may lead to underestimating the effects of retirement to change in body weight and waist circumference.

Research Design and Implementation Criteria Checklist: Primary Research

Relevance Questions

1.	Would implementing the studied intervention or procedure (if found successful) result in improved outcomes for the patients/clients/population group? (Not Applicable for some epidemiological studies)	N/A
2.	Did the authors study an outcome (dependent variable) or topic that the patients/clients/population group would care about?	Yes
3.	Is the focus of the intervention or procedure (independent variable) or topic of study a common issue of concern to nutrition or dietetics practice?	Yes
4.	Is the intervention or procedure feasible? (NA for some epidemiological studies)	N/A

Validity Questions

1.	**Was the research question clearly stated?**	Yes
1.1.	Was (were) the specific intervention(s) or procedure(s) [independent variable(s)] identified?	Yes
1.2.	Was (were) the outcome(s) [dependent variable(s)] clearly indicated?	Yes
1.3.	Were the target population and setting specified?	Yes
2.	**Was the selection of study subjects/patients free from bias?**	Yes

2.1.	Were inclusion/exclusion criteria specified (e.g., risk, point in disease progression, diagnostic or prognosis criteria), and with sufficient detail and without omitting criteria critical to the study?	Yes
2.2.	Were criteria applied equally to all study groups?	Yes
2.3.	Were health, demographics, and other characteristics of subjects described?	Yes
2.4.	Were the subjects/patients a representative sample of the relevant population?	Yes
3.	**Were study groups comparable?**	Yes
3.1.	Was the method of assigning subjects/patients to groups described and unbiased? (Method of randomization identified if RCT)	Yes
3.2.	Were distribution of disease status, prognostic factors, and other factors (e.g., demographics) similar across study groups at baseline?	Yes
3.3.	Were concurrent controls used? (Concurrent preferred over historical controls.)	N/A
3.4.	If cohort study or cross-sectional study, were groups comparable on important confounding factors and/or were preexisting differences accounted for by using appropriate adjustments in statistical analysis?	Yes
3.5.	If case control or cross-sectional study, were potential confounding factors comparable for cases and controls? (If case series or trial with subjects serving as own control, this criterion is not applicable. Criterion may not be applicable in some cross-sectional studies.)	N/A
3.6.	If diagnostic test, was there an independent blind comparison with an appropriate reference standard (e.g., "gold standard")?	N/A
4.	**Was method of handling withdrawals described?**	Yes
4.1.	Were follow-up methods described and the same for all groups?	Yes
4.2.	Was the number, characteristics of withdrawals (i.e., dropouts, lost to follow up, attrition rate) and/or response rate (cross-sectional studies) described for each group? (Follow up goal for a strong study is 80%.)	Yes
4.3.	Were all enrolled subjects/patients (in the original sample) accounted for?	Yes
4.4.	Were reasons for withdrawals similar across groups?	Yes
4.5.	If diagnostic test, was decision to perform reference test not dependent on results of test under study?	N/A
5.	**Was blinding used to prevent introduction of bias?**	Yes
5.1.	In intervention study, were subjects, clinicians/practitioners, and investigators blinded to treatment group, as appropriate?	N/A
5.2.	Were data collectors blinded for outcomes assessment? (If outcome is measured using an objective test, such as a lab value, this criterion is assumed to be met.)	Yes
5.3.	In cohort study or cross-sectional study, were measurements of outcomes and risk factors blinded?	Yes
5.4.	In case control study, was case definition explicit and case ascertainment not influenced by exposure status?	N/A
5.5.	In diagnostic study, were test results blinded to patient history and other test results?	N/A
6.	**Were intervention/therapeutic regimens/exposure factor or procedure and any comparison(s) described in detail? Were interveningfactors described?**	Yes
6.1.	In RCT or other intervention trial, were protocols described for all regimens studied?	N/A
6.2.	In observational study, were interventions, study settings, and clinicians/provider described?	Yes
6.3.	Was the intensity and duration of the intervention or exposure factor sufficient to produce a meaningful effect?	Yes
6.4.	Was the amount of exposure and, if relevant, subject/patient compliance measured?	N/A
6.5.	Were co-interventions (e.g., ancillary treatments, other therapies) described?	N/A
6.6.	Were extra or unplanned treatments described?	N/A
6.7.	Was the information for 6.4, 6.5, and 6.6 assessed the same way for all groups?	N/A
6.8.	In diagnostic study, were details of test administration and replication sufficient?	N/A
7.	**Were outcomes clearly defined and the measurements valid and reliable?**	Yes
7.1.	Were primary and secondary endpoints described and relevant to the question?	Yes
7.2.	Were nutrition measures appropriate to question and outcomes of concern?	Yes
7.3.	Was the period of follow-up long enough for important outcome(s) to occur?	Yes

	7.4.	Were the observations and measurements based on standard, valid, and reliable data collection instruments/tests/procedures?	Yes
	7.5.	Was the measurement of effect at an appropriate level of precision?	Yes
	7.6.	Were other factors accounted for (measured) that could affect outcomes?	Yes
	7.7.	Were the measurements conducted consistently across groups?	Yes
8.	**Was the statistical analysis appropriate for the study design and type of outcome indicators?**		Yes
	8.1.	Were statistical analyses adequately described and the results reported appropriately?	Yes
	8.2.	Were correct statistical tests used and assumptions of test not violated?	Yes
	8.3.	Were statistics reported with levels of significance and/or confidence intervals?	Yes
	8.4.	Was "intent to treat" analysis of outcomes done (and as appropriate, was there an analysis of outcomes for those maximally exposed or a dose-response analysis)?	N/A
	8.5.	Were adequate adjustments made for effects of confounding factors that might have affected the outcomes (e.g., multivariate analyses)?	Yes
	8.6.	Was clinical significance as well as statistical significance reported?	Yes
	8.7.	If negative findings, was a power calculation reported to address type 2 error?	N/A
9.	**Are conclusions supported by results with biases and limitations taken into consideration?**		Yes
	9.1.	Is there a discussion of findings?	Yes
	9.2.	Are biases and study limitations identified and discussed?	Yes
10.	**Is bias due to study's funding or sponsorship unlikely?**		Yes
	10.1.	Were sources of funding and investigators' affiliations described?	Yes
	10.2.	Was the study free from apparent conflict of interest?	Yes